

## Claims

- 1     **Claim 1.** A valve, comprising:
- 2             a valve body having first and second ends, the valve body defining
- 3     a hollow valve body interior extending between the first and second ends
- 4     that couples the first and second ends in fluid communications;
- 5             an opening-defining portion of the valve body that defines an access
- 6     opening in the valve body;
- 7             isolation means for enabling a user to selectively stop and unstop
- 8     fluid communications between the first and second ends of the valve body,
- 9     including a valve-stopping mechanism removably mounted within the
- 10    access opening; and
- 11            connection-facilitating means on the opening-defining portion of the
- 12    valve body for facilitating the fluid-tight removable connection of a
- 13    separate isolation valve assembly to the opening-defining portion of the
- 14    valve body in a position over the access opening that enables the user to
- 15    remove the valve-stopping mechanism from the access opening through
- 16    the isolation valve assembly.

1    **Claim 2.**    A valve as recited in claim 1, wherein the opening-defining  
2    portion of the valve body includes a flange that functions as means for  
3    facilitating the connection of the isolation valve assembly to the  
4    opening-defining portion of the valve body by bolting.

1    **Claim 3.**    A valve as recited in claim 1, wherein the opening-defining  
2    portion of the valve body includes an exterior thread that functions as  
3    means for facilitating the connection of the isolation valve assembly to the  
4    opening-defining portion of the valve body by threaded engagement.

1    **Claim 4.**    A valve as recited in claim 1, wherein the opening-defining  
2    portion of the valve body includes at least one annular groove that  
3    functions as means for facilitating the connection of the isolation valve  
4    assembly to the opening-defining portion of the valve body with sealing  
5    member between the isolation valve assembly and the opening-defining  
6    portion.

1    **Claim 5.**    A valve as recited in claim 1, wherein the opening-defining  
2    portion of the valve body includes at least one annular groove that  
3    functions as means for facilitating connection of the isolation valve  
4    assembly to the opening-defining portion of the valve body with a mating  
5    annular ring on the isolation valve assembly.

1     **Claim 6.**   A valve as recited in claim 1, wherein the opening-defining  
2     portion of the valve body includes at least one annular ring that functions  
3     as means for facilitating the connection of the isolation valve assembly to  
4     the opening-defining portion of the valve body with a mating annular  
5     groove on the isolation valve assembly.

1     **Claim 7.**   A valve as recited in claim 1, wherein the opening-defining  
2     portion of the valve body includes at least one segmented annular groove  
3     that functions as means for facilitating connection of the isolation valve  
4     assembly to the opening-defining portion of the valve body with a mating  
5     segmented annular ring on the isolation valve assembly in a cam lock  
6     engagement.

1     **Claim 8.**   A valve as recited in claim 1, wherein the opening-defining  
2     portion of the valve body includes at least one segmented annular ring  
3     that functions as means for facilitating the connection of the isolation valve  
4     assembly to the opening-defining portion of the valve body with a mating  
5     segmented annular groove in the isolation valve assembly in a cam lock  
6     engagement.

1     **Claim 9.**   A valve as recited in claim 1, wherein the valve-stopping  
2     mechanism is removably mounted within the hollow valve body.

1     **Claim 10.** A method for repairing under pressure a valve having a valve  
2     body, an opening-defining portion of the valve body that defines an access  
3     opening, a valve-stopping mechanism removably mounted within the  
4     access opening, and means on the opening-defining portion of the valve  
5     body for facilitating the connection of a separate isolation valve assembly  
6     to the opening-defining portion, the method comprising:

7             providing a valve-servicing assembly of which the isolation valve  
8     assembly is a part such that the isolation valve assembly has first and  
9     second ends and a size large enough to enable a user to remove the  
10    valve-stopping mechanism from the access opening through the isolation  
11    valve assembly, the valve-servicing assembly including a chamber-defining  
12    structure connected to the second end of the isolation valve assembly that  
13    defines a chamber in which the valve-stopping mechanism fits;

14            connecting the first end of the isolation valve assembly to the  
15    opening-defining portion of the valve body in a position over the access  
16    opening;

17            withdrawing the valve-stopping mechanism from the access opening,  
18    through the isolation valve assembly, into the fluid-tight chamber; and

19            closing the isolation valve assembly.

1    **Claim 11.** A method as recited in claim **10**, further comprising:  
2           removing the valve-stopping mechanism from the fluid-tight chamber  
3    and servicing the valve-stopping mechanism;  
4           placing the valve-stopping mechanism back into the fluid-tight  
5    chamber;  
6           opening the isolation valve assembly; and  
7           advancing the valve-stopping mechanism from the fluid-tight  
8    chamber through the isolation valve assembly back into the access  
9    opening.

1    **Claim 12.** A method as recited in claim **11**, further comprising the step  
2    of disconnecting the first end of the isolation valve assembly from the  
3    opening-defining portion of the valve body.

1    **Claim 13.** A method as recited in claim **10**, further comprising:  
2           removing the valve-stopping mechanism from the fluid-tight chamber;  
3           placing a replacement valve-stopping mechanism into the fluid-tight  
4    chamber;  
5           opening the isolation valve assembly; and  
6           advancing the replacement valve-stopping mechanism from the  
7    fluid-tight chamber through the isolation valve assembly into the access  
8    opening.

1    **Claim 14.** A method as recited in claim **13**, further comprising the step  
2    of disconnecting the first end of the isolation valve assembly from the  
3    opening-defining portion of the valve body.

1    **Claim 15.** A method as recited in claim **10**, further comprising the step  
2    of cleaning the hollow interior of the valve body through the isolation valve  
3    assembly.

1    **Claim 16.** A valve as recited in claim **10**, wherein the valve-stopping  
2    mechanism is removably mounted within the hollow valve body.

1     **Claim 17.** A valve, comprising:  
2             a valve body having first and second ends, the valve body defining  
3     a hollow valve body interior extending between the first and second ends  
4     that couples the first and second ends in fluid communications;  
5             an opening-defining portion of the valve body that defines an access  
6     opening in the valve body; and  
7             connection-facilitating means on the opening-defining portion of the  
8     valve body for facilitating the fluid-tight removable connection of a  
9     separate isolation valve assembly to the opening-defining portion of the  
10    valve body in a position over the access opening that enables the user to  
11    install a valve-stopping mechanism into the access opening through the  
12    isolation valve assembly.

1     **Claim 18.** A valve as recited in claim 17, wherein the opening-defining  
2     portion of the valve body includes a flange that functions as means for  
3     facilitating the connection of the isolation valve assembly to the  
4     opening-defining portion of the valve body by bolting.

1     **Claim 19.** A valve as recited in claim 17, wherein the valve-stopping  
2     mechanism is installed into the hollow valve body through the isolation  
3     valve assembly.

1    **Claim 20.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes an exterior thread that functions as  
3    means for facilitating the connection of the isolation valve assembly to the  
4    opening-defining portion of the valve body by threaded engagement.

1    **Claim 21.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes an exterior thread and at least annular  
3    O-ring groove that functions as means for facilitating the connection of the  
4    isolation valve assembly to the opening-defining portion of the valve body  
5    by threaded and compressed rubber engagement.

1    **Claim 22.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes an exterior thread and at least one  
3    receiving O-ring surface that functions as means for facilitating the  
4    connection of the isolation valve assembly to the opening-defining portion  
5    of the valve body by threaded and compressed rubber engagement.

1    **Claim 23.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes at least one annular groove that  
3    functions as means for facilitating the connection of the isolation valve  
4    assembly to the opening-defining portion of the valve body with sealing  
5    member between the isolation valve assembly and the opening-defining  
6    portion.



1    **Claim 24.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes at least one annular groove that  
3    functions as means for facilitating connection of the isolation valve  
4    assembly to the opening-defining portion of the valve body with a mating  
5    annular ring on the isolation valve assembly.

1    **Claim 25.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes at least one annular ring that functions  
3    as means for facilitating the connection of the isolation valve assembly to  
4    the opening-defining portion of the valve body with a mating annular  
5    groove on the isolation valve assembly.

1    **Claim 26.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes at least one segmented annular groove  
3    that functions as means for facilitating connection of the isolation valve  
4    assembly to the opening-defining portion of the valve body with a mating  
5    segmented annular ring on the isolation valve assembly in a cam lock  
6    engagement.

1    **Claim 27.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes at least one segmented annular ring  
3    that functions as means for facilitating the connection of the isolation valve  
4    assembly to the opening-defining portion of the valve body with a mating  
5    segmented annular groove in the isolation valve assembly in a cam lock  
6    engagement.

1    **Claim 28.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes an interior thread that functions as  
3    means for facilitating the connection under pressure of the valve-stopping  
4    mechanism to the opening-defining portion of the valve body by threaded  
5    engagement.

1    **Claim 29.** A valve as recited in claim 17, wherein the opening-defining  
2    portion of the valve body includes an interior thread that functions as  
3    means for restraining the connection under pressure of the valve-stopping  
4    mechanism to the opening-defining portion of the valve body by threaded  
5    engagement and as means for allowing at least one O-ring sealing surface  
6    in the opening-defining portion.

1     **Claim 30.** A valve as recited in claim 17, wherein the opening-defining  
2     portion of the valve body includes at least one actuating member which  
3     includes threads formed thereon and threadedly mounted in said  
4     opening-defining portion so that when activated moves into and out of  
5     engagement of the valve-stopping mechanism.

1     **Claim 31.** A valve as recited in claim 17, further comprising at least one  
2     segment-engaging element coupled to said segment and slidably mounted  
3     in the opening-defining portion of the valve body for engaging and locking  
4     said segment in position to restrain the valve-operating mechanism and at  
5     least one actuating member including threads formed thereon and  
6     threadedly mounted in said opening-defining portion for slidingly actuating  
7     said segment engaging member for moving said segment into and out of  
8     engagement of the valve-stopping mechanism.